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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MORILLO, JANELLE COMBS

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

03/25/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 09/355,987	Applicant(s) BARRESI ET AL.	
	Examiner Janelle Morillo	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5,7-14 and 18-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,7-14 and 18-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1793

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 21, 23, and 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original specification does not provide support for the maximum solution heating time of 3.9 hrs (cl. 21) or 3 hrs (cl. 25). Claims dependent on the above rejected claims are likewise rejected under this statute. Appropriate correction is required.

Claim Rejections - 35 USC § 102/103

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 5, 7-14, 18-20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over “Aluminum and Aluminum Alloys” p 220, 297, 718-719, 722.

Art Unit: 1793

The “Aluminum and Aluminum Alloys” teaches that cast aluminum alloy 356.0 has a composition comprising:

6.5-7.5% Si
0.20-0.45% Mg
0.6% max. Fe
balance aluminum and impurities

(page 718), which substantially overlaps “with sufficient specificity” the composition as presently claimed in claims 1, 5, 20. Additionally, A356.0 overlaps the claimed composition “with sufficient specificity” as well. “Aluminum and Aluminum Alloys” teaches that castings of Al-Si alloy A356 have high strength and high elongation when the dendritic cell size ranges from are low, for instance 22 μm (Fig. 44 page 220), which meets the instant DAS limitation (cl. 1, 5, 20). Said Al-Si casting alloy is typically solution heat treated, quenched in hot water (~ 65 - 100°C), and aged at 150 - 230°C for 2-9 hours (Table 36, page 722), which are substantially the same process steps as presently claimed in claims 12-14, 19. “Aluminum and Aluminum Alloys” p 297 further teaches that solution heat treatment at 540°C for 4-12 hrs is sufficient to provide a T6 peak strength temper for a 356.0 permanent mold cast alloy.

Concerning the presence of iron containing phases β and π (cl. 1-3, 5, 7-10, 16, 17, 20), or the claimed “Quality Index” (cl. 20), the prior art does not teach what phases are present in the final (and intermediate) aluminum alloy or the quality index. However, because “Aluminum and Aluminum Alloys” teaches casting at a solidification rate suitable to produce fine DAS within the instantly claimed range, and the present specification states that “solution treatment at 540°C for 2 or more hours produced desired levels of transformation of β to π phase” (page 8 lines 13-15), which is substantially the same as the solution heat treatment steps of the prior art (wherein the prior art teaches solution heating at 540°C for 4-12 hrs). Because the prior art discloses a

Art Unit: 1793

substantially identical aluminum alloy processed in substantially the same steps, substantially the same properties (microstructure, quality index) would result as presently claimed.

It is held “Aluminum and Aluminum Alloys” anticipates the presently claimed invention. Alternatively with regard to the process steps, it is well settled that a product-by-process claim defines a product, and that when the prior art discloses a product substantially the same as that being claimed, differing only in the manner by which it is made, the burden falls to applicant to show that any process steps associated therewith result in a product materially different from that disclosed in the prior art. See MPEP 2113, *In re Brown* (173 USPQ 685) and *In re Fessman* (180 USPQ 524) *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292. Applicant has not shown that the product taught by the prior art of “Aluminum and Aluminum Alloys” is materially different than the claimed product by process.

Alternatively, overlapping ranges have been held to be a prima facie case of obviousness, see MPEP § 2144.05. It would have been obvious to one of ordinary skill in the art to select any portion of the range, including the claimed range, from the broader range disclosed in the prior art, because the prior art finds that said composition in the entire disclosed range has a suitable utility. It is held that “Aluminum and Aluminum Alloys” has created a prima facie case of obviousness of the presently claimed invention.

Once a reference teaching product appearing to be substantially identical is made the basis of a rejection, and the examiner presents evidence or reasoning tending to show inherency,

Art Unit: 1793

the burden shifts to the applicant to show an unobvious difference. "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)), see MPEP 2112. In re Schreiber, 128 F.3d 1473, 1478, 44 USPQ2d 1429, 1432 (Fed.Cir.1997). Applicant has not clearly shown an unobvious difference between the instant invention and the prior art's product.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over "Aluminum and Aluminum Alloys" p 220, 297, 718-719, 722.

"Aluminum and Aluminum Alloys" is discussed in paragraphs above.

Particularly concerning the process steps, said Al-Si casting alloy is typically solution heat treated, quenched in hot water (~ 65-100°C), and aged at 150-230°C for 2-9 hours (Table 36, page 722). "Aluminum and Aluminum Alloys" p 297 further teaches that solution heat treatment at 540°C for 4-12 hrs is sufficient to provide a T6 peak strength temper for a 356.0 permanent mold cast alloy, which is a close approximation of the presently claimed solution heat treatment time maximum of 3.9 hrs.

Because "Aluminum and Aluminum Alloys" teaches a substantially identical Al-Si-Mg alloy process by casting with a DAS between the claimed ranges, and heat treating for times and

Art Unit: 1793

temperatures that fall within the claimed parameters (or are a close approximation), then substantially the same microstructure (such as transformation of pi phase to the beta phase) is expected to occur. It is held that “Aluminum and Aluminum Alloys” has created a prima facie case of obviousness of the presently claimed invention.

7. Claims 22, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over “Aluminum and Aluminum Alloys” p 220, 297, 718-719, 722.

“Aluminum and Aluminum Alloys” is discussed in paragraphs above. “Aluminum and Aluminum Alloys” does not specify the matrix has an average DAS of between 10 and 20 microns.

However, concerning the amended limitation of an average DAS of between 10-20 μm , “Aluminum and Aluminum Alloys” teaches the relationship between Tensile properties and Dendrite cell size for A356-T62 alloy in Fig. 44 on p 220. In particular, “Aluminum and Aluminum Alloys” teaches DAS (and therefore tensile properties) are controlled exclusively by solidification rate (p 220, 2nd column, “Dendrite Arm Spacing”). Fig. 44 shows samples ranging in solidification rate, representing various casting processes (p 220, 2nd column, “Dendrite Arm Spacing”). It would have been obvious to one of ordinary skill in the art to have solidified at a higher solidification rate, in order to produce the predictable results of smaller dendrite cell size (result effective variable).

8. Claim 21, 23, and 25 rejected under 35 U.S.C. 103(a) as being unpatentable over “Aluminum and Aluminum Alloys” p 220, 297, 718-719, 722 in view of Wei (US 5,536,337).

“Aluminum and Aluminum Alloys” is discussed in paragraphs above.

Art Unit: 1793

“Aluminum and Aluminum Alloys” does not teach solution heat treating the casting for a time between 2.0-3.0 hrs (cl. 24) or 2-3.9 hrs (cl. 21). However, Wei, who is also drawn to processing A356 and similar alloys, teaches cast Al-Si components (such as A356) are solution heat treated for at least 2 hrs (column 2 lines 37-38), that is, precipitates are solutionized in A356 when held at temperatures approximately 1000°F (540°C) for time ≥ 2 hrs (column 2 line 17). Wei teaches that longer times are used during solution heat treatment process in order to ensure that when large numbers of components are processed in a batch type manner, the temperature is even and uniform (column 2 lines 30-34). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used shorter solution heat treatment times, such as ≥ 2 hrs taught by Wei, instead of “Aluminum and Aluminum Alloys” teaching of 4 hrs when processing individual components/small number of components in batch type manner, because Wei teaches that 2 hrs at 540°C is sufficient time for precipitates to solutionize for A356 alloys.

Concerning claim 23, see above for discussion of average DAS.

Response to Arguments

9. In the response filed on February 3, 2010, applicant amended claims 22 and 23, added new claims 24 and 25, and submitted various arguments traversing the rejections of record.

10. Applicant’s argument that the present invention is allowable over the prior art of record because the prior art does not teach solution heating for 2-3.9 hrs (cl. 21) or 2-3 hrs (cl. 25), which is critical to produce the desired levels of transformation from the pi phase to the beta

Art Unit: 1793

phase has not been found persuasive. As stated above, Wei teaches motivation to solution heat treat for shorter times, such as 2 hrs.

11. Applicant's argument that the present invention is allowable over the prior art of record because the instant invention discloses a critical combination of composition + solidification rate (DAS)+ solution heat treatment conditions, and the level of selection would not be obvious to one of ordinary skill in the art has not been found persuasive. The prior art teaches an overlapping Al-Si-Mg composition, motivation to apply high solidification rate/small DAS, and solution heat treatment conditions that are sufficient to solutionize, that overlap the instant ranges. With respect to the overlap, applicant has not shown unexpected results.

12. As stated previously, applicant's argument that the present invention is allowable over the prior art of record because applicant has more narrowly defined the DAS, and the prior art at Fig. 44 discloses a wide range of DAS and there is no basis to select the claimed amount from the prior art's teaching has not been found persuasive. On page 220 Fig. 44 of "Aluminum and Aluminum Alloys" shows a trend/ relationship between A356 aluminum alloy's DAS and the expected elongation and strength properties. It would have been obvious to one of ordinary skill in the art to have formed an aluminum alloy with fine average DAS, such as 22 μm , because "Aluminum and Aluminum Alloys" teaches said fine DAS exhibits good strength properties and high elongation. The examiner disagrees that Table 36 and Figure 44 are not consistent/directly compatible- Table 36 gives typical T6 heat treatment parameters for A356, Fig. 44 states alloys in a T62 (which includes a T6 temper) temper exhibit certain properties.

13. Once a prima facie case exists, burden is on applicant to show unexpected results- not on examiner to show that there is none. *In re Mayne* 104 F.3d at 1342, 41 USPQ2d at 1454. Additionally, the prior art's product by process is held to anticipate the instant claims.

Art Unit: 1793

Once a reference teaching product appearing to be substantially identical is made the basis of a rejection, and the examiner presents evidence or reasoning tending to show inherency, the burden shifts to the applicant to show an unobvious difference. "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products." *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)), see MPEP 2112. Applicant has not clearly shown an unobvious difference between the instant invention and the prior art's product, wherein the prior art is held to anticipate, or in the alternative, create a prima facie case of obviousness, of the presently claimed invention.

14. As stated previously, Applicant's argument that the present invention is allowable over the prior art of record because applicant has shown unexpected results has not clearly been found persuasive. Applicant has not clearly shown specific unexpected results with respect to the prior art of record or criticality of the instant claimed range (wherein said results must be fully commensurate in scope with the instantly claimed ranges, etc. see MPEP 716.02 d). To establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. *In re Hill*, 284 F.2d 955, 128 USPQ 197 (CCPA 1960). In the instant case, it is unclear from Fig. 1 that the claimed Al-Si-Mg alloy has unexpectedly improved mechanical properties.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Morillo whose telephone number is (571) 272-1240. The examiner can normally be reached on 7:30 am- 6:00 pm Mon-Wed.

Art Unit: 1793

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit
1793

/J. M./
Examiner, Art Unit 1793
March 15, 2010